

money if its bids were hit. Bids on the IDCG market were firm, committing the bidder to buy at the posted price and quantity. Overall, DRW posted bids for an average of nearly 47 minutes. Further, DRW's bids during the Settlement Period were posted for an average of more than 17 minutes, longer than the settlement window itself and a substantial period of time to be recognized (and traded against) by other market participants. These time frames are also long enough to expose DRW to the risk of short-term market movements.

105. The CFTC's assertion that DRW placed bids that "DRW knew would never be accepted" is also false. DRW's bids were higher than the Corresponding Rates, offering a premium to trade in the Three Month Contract above what the OTC interest rate swap market was quoting. DRW's bids were competitively priced (relative to the Corresponding Rates) to be attractive to prospective sellers. While, according to DRW, its bids were (rationally) below what it perceived as fair value, leaving room for a profit, traders who valued the NPV and convexity effects differently may well have found DRW's bids attractive. For instance, prices from the Hull-White One-Factor model that I have estimated here do not perfectly coincide with each other or with DRW's bids. Likewise, estimates using related single-or multi-factor Heath-Jarrow-Merton models are likely to yield different estimates as well.<sup>90</sup>
106. Moreover, at least one of DRW's bids attracted trading interest from MF Global. I understand that DRW's posted bid drew the attention of MF Global, which led to negotiations about prices for a larger trade that was agreed to at a much higher rate than the Corresponding Rate. This trade was ultimately "busted" (it never cleared) at the

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<sup>90</sup> See Henrard (2012) and Kennedy, Gary, "Swap Futures in HJM One-Factor Model," SSRN 1648419, (2010). Available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1648419](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1648419).

request of MF Global.<sup>91</sup> This is consistent with the fact that DRW's bids, which, while substantially higher than the Corresponding Rates, were at that time still well below fair value. Thus, not only does this confirm that the Corresponding Rates were not a viable basis to settle the Three Month Contract, it also bolsters IDCH's decision to continue to use DRW's electronic bids in its settlement curve after the busted trade.

107. As an indirect counterparty to DRW's long position in the Three Month Contract, Jefferies acknowledged that leaving short positions (entered into at the Corresponding Rate) in place through maturity would "eat away capital in the form of initial margin postings."<sup>92</sup> To compensate for this fact, Three Month Contract prices should have been higher than OTC interest rate swap prices. DRW's bids were indeed higher and reflected a true willingness to trade at its publicly posted prices and quantities (*i.e.*, notional amounts).

### **C. DRW's Bids Provided Market Liquidity and Contributed to Price Discovery**

108. DRW's bids were open for an extended duration (almost 47 minutes, on average), were posted throughout the trading day (only 40% were new bids during the Settlement Period), and were for a substantial size. As such, DRW's bids provided much-needed market liquidity to the Three Month Contract. In fact, by directly incorporating the NPV and convexity effects into its bids, DRW served the market well, by actively participating in price discovery.
109. As noted above, DRW's bids during the Settlement Period stood out as the most important means of price discovery. Given that settlement procedures are closely

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<sup>91</sup> Communications between NewEdge and DRW, February 2, 2011, D0000253-286.

<sup>92</sup> Findings of Fact and Conclusions of Law, January 9, 2013, ¶46, JEF-CFTC-476403-33.

monitored and strictly enforced, the settlement period often reveals the most informative supply and demand data of the trading day. As such, prices during settlement periods are considered the most robust prices of the day and are the most widely disseminated prices of the day (and, here, were utilized by IDCH for daily margin calculations). Importantly, DRW's bids during the Settlement Period were posted for an average of more than 17 minutes, longer than the settlement window itself, and clearly contributed to price discovery in this window.

110. It is my understanding that there were few, if any, electronic bids for the Three Month Contract during the Settlement Period or otherwise prior to DRW's bidding activity during the Relevant Period. DRW's bids during the day, and particularly during the Settlement Period, contributed greatly to price discovery for the Three Month Contract.

**D. DRW's Profit Is a Result of a Trading Strategy Based on the Assessment of the Fair Economic Value of the Three Month Contract and Not a Result of its Electronically Submitted Bids**

111. Regardless of whether IDCH continued to establish settlement prices based on the Corresponding Rates (as it did before the Relevant Period) or it moved its settlement curve toward fair value (as it did during the Relevant Period), DRW would have made nearly the same profits by virtue of originally entering into the long side of the Three Month Contract at or near the Corresponding Rates.
112. As acknowledged by Jefferies, the indirect short counterparty to DRW in the Three Month Contracts, holding its short positions through maturity would have "eat[en] away capital in the form of initial margin postings."<sup>93</sup> As Christopher Bury, Jefferies'

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<sup>93</sup> Findings of Fact and Conclusions of Law, January 9, 2013, ¶46, JEF-CFTC-476417 (quoting Christopher Bury).



Head of U.S. Rates, Trading, and Sales, and Garry O'Connor, IDCH's CEO during the Relevant Period, indicated, the erosion of capital would accrue over the life of the Three Month Contract, even if its settlement rates had remained at the Corresponding Rates (except the loss would have accrued more slowly over time due to the lack of a PAI adjustment).<sup>94</sup> This erosion would occur as long as the daily process of clearing generated cash flows via variation margin over the life of the contract.

113. Jefferies ultimately opted to pay DRW in excess of \$15 million to unwind its open positions, rather than hold those positions through maturity, despite the fact that, on August 11, 2011 the "closing value of economically equivalent OTC [Interest Rate] Swaps" was just above \$7.0M in favor of Jefferies.<sup>95</sup> This is because Jefferies, by that time, realized that DRW's valuation of the impact of the convexity and NPV effects on the Three Month Contract was accurate<sup>96</sup> and, thereby, acknowledged that the Three Month Contract should not have been priced based on the Corresponding Rates. Thus, Jefferies' payment appears to be a rational decision to exit a position in the Three Month Contract that was entered into at or near the disadvantageous Corresponding Rates. In no way does it represent DRW's profits from allegedly manipulated prices.
114. The fact is that the Three Month Contract is only accurately priced with the NPV and convexity effects included. The Three Month Contract was simply worth more than the underlying OTC interest rate swap contract because of the NPV and convexity effects. The IDEX Curve should have priced in these effects to represent true supply and demand for the Three Month Contract.

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<sup>94</sup> Findings of Fact and Conclusions of Law, January 9, 2013, ¶46, JEF-CFTC-476417.

<sup>95</sup> Findings of Fact and Conclusions of Law, January 9, 2013, ¶63, JEF-CFTC-476421.

<sup>96</sup> Deposition of Christopher Bury, May 29, 2015, pp. 26-27.

115. As discussed extensively above, the process of learning and of adjusting the IDCH curve to prices where supply or demand is balanced is, in economic terms, simply the price discovery process. The process did not generate profits for DRW, but only moved profits forward in time as the market learned where supply or demand would be balanced.

## **XII. ANALYSIS OF MR. MACLAVERTY'S REPORT**

116. Mr. MacLavery states he was asked by CFTC's counsel to opine on several aspects of the current matter by, among other things, (i) providing a general discussion of derivatives especially interest rate swap futures contracts; (ii) conducting an analysis of the Three Month Contract; (iii) discussing DRW's trading activity; and (iv) performing a profit and loss analysis on DRW's trades.<sup>97</sup>
117. Having evaluated the opinions expressed by Mr. MacLavery, I find several important flaws in his analysis that lead to incorrect conclusions. Mr. MacLavery's overall approach and analysis are flawed by virtue of making unreasonable assumptions and unsupported and incorrect statements. I disagree with Mr. MacLavery's findings because he:
- makes inappropriate assumptions regarding settlement prices of the Three Month Contract that affect his analysis;
  - makes flawed and unsupported statements suggesting that DRW's bids reflected artificial prices;
  - provides an inadequate and overly simplistic approach, failing to support his arguments with reliable empirical analysis;

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<sup>97</sup> MacLavery Report ¶¶10-14.

- makes incorrect statements regarding the convexity effect and largely ignores the NPV effect;
- uses the unsupported and inappropriate Corresponding Rates without economic justification; and
- makes incorrect and unsubstantiated statements regarding price discovery.

**A. Mr. MacLavery's Assumptions Regarding Settlement Prices Are Without a Factual Basis**

118. Mr. MacLavery assumes that, absent DRW's bids, the Three Month Contract's daily settlement prices would have been set at the Corresponding Rates.<sup>98</sup> This assumption, however, is flawed for two reasons. First, as noted above, prices of non-cleared OTC interest rate swaps are, and should be, distinctly different from prices of cleared contracts such as the Three Month Contract in question here. Indeed, the existence of the NPV and convexity effects leads to these valuation differentials as a matter of fact (and not one of "potential" as Mr. MacLavery has opined). Because here, as noted above, IDCH had an obligation to ensure that its daily settlement rates were a "fair and appropriate reflection of the market,"<sup>99</sup> it would not have "been prudent from a risk management perspective" for IDCH to continue setting its daily settlement prices to the Corresponding Rates.<sup>100</sup> Second, I have seen no evidence to suggest that, if DRW had

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<sup>98</sup> MacLavery Report ¶¶30-32.

<sup>99</sup> IDCH Rulebook, p. 100.

<sup>100</sup> Email exchange between Michael Dundon and Rae Etherington regarding IDCH Adjustment of Revaluation Curve, January 2, 2011, JEF-CFTC-474513-514.

stopped injecting bids during the Settlement Period, IDCH would have necessarily reverted back to settling the Three Month Contract at Corresponding Rates.<sup>101</sup>

**B. Mr. MacLavery's Statements that DRW's Bids Reflected Artificial Prices Are Wrong and Unsupported**

119. While Mr. MacLavery asserts that DRW's bids were artificial, he provides no evidence whatsoever that this is true. Rather, he simply compares the Corresponding Rates to the bids posted by DRW and notes that they are different.<sup>102</sup> This, however, does not lead to the conclusion that DRW's bids failed to reflect legitimate supply or demand for the Three Month Contract. And, more importantly, my own analysis of the Three Month Contract, which Mr. MacLavery did not perform, confirms that DRW's bid prices are actually closer to the fair value of the Three Month Contract than any price previously or concurrently derived from non-cleared OTC interest rate swap transactions (See discussion of the NPV and convexity effects in Section VII).
120. A simple assertion that prices are different, without a thorough analysis of why they might be, cannot be a valid justification for assessing an artificial price. In this regard, I find that Mr. MacLavery's conclusion on artificial prices is misleading and completely unreliable from both a scientific and economic view. A rigorous approach to determining artificiality would be to compute an actual value for the Three Month Contract, and compare it to DRW's bids, something I have done in this report, and something DRW did and later shared with the marketplace.<sup>103</sup> Apparently, Mr.

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<sup>101</sup> In fact, Garry O'Connor testified to the contrary. See Deposition of Garry O'Connor, September 18, 2012, p. 240-41. See also Exhibits 4A through 4G.

<sup>102</sup> MacLavery Report ¶54 and ¶69.

<sup>103</sup> See Cont *et al.* (2011).



MacLavery did not even check DRW's computations as reported in Cont *et al.* (2011), let alone do his own computations.

### **1. No Justification for Finding Artificial Prices**

121. From a rational economic standpoint (the standard applied in U.S. financial regulatory bodies), an artificial price is a price that deviates from what true supply or demand would otherwise dictate. In this case, with the exception of DRW's bids, observed supply or demand for the Three Month Contract was virtually nil because the Three Month Contract did not trade actively on the exchange. However, we can rationally conduct a thought experiment to ascertain whether DRW's bids might have created an artificial price.
122. First, consider whether incorporating DRW's bids into prices results in prices that were artificially low. This case is easily discarded. DRW's bids were placed at higher yields than the Corresponding Rates, thus if DRW's bid prices were artificially low, the Corresponding Rates were even more so.
123. Second, consider whether prices were artificially high (which the CFTC seems to imply without actually saying so). The fact that proper pricing mechanisms, which consider the NPV and convexity effects, would lead to higher prices than the Corresponding Rates creates a somewhat larger hurdle to prove that prices were "artificially high." Nonetheless, even without assessing these effects, we can think through the consistency and rationality of Mr. MacLavery's assertions. If prices were "too high" relative to the true market price, then the lack of trading against DRW's bids undermines his assertions—a rational response to a quote that is "too high" would be for another trader to take the other side to reap the benefits of this artificial price. The fact that none of



DRW's bids were directly hit does not support Mr. MacLavery's assertion, but rather undermines his case.

**2. Failure to Understand DRW's Bids**

124. DRW's bids were justified by rational economic behavior. The price of the Three Month Contract involved the value of a non-cleared swap contract plus the estimated value of the NPV and convexity effects. Given that the cash flows involved with daily clearing gave rise to differences between the non-cleared swap and its cleared counterpart, a rational trading strategy would involve bidding at some price above the non-cleared swap price but at or below the fair value of the non-cleared swap price plus the value of the NPV and convexity effects. Purchases at any price below fair value would represent a rational economic motive to transact.
125. Moreover, DRW's bids were not cursory in nature. In an era of electronic financial markets, posting a bid for as long as 15 minutes during the Settlement Period (or for 15 minutes during ANY time of the day) represents true liquidity to the market. DRW's bids were not secret, DRW's bids were for substantial size, and, by the trading rules established by IDCH, DRW's bids were firm.
126. Notwithstanding the fact that DRW's bids represented true demand to trade substantial quantities at firm prices, the CFTC (and Mr. MacLavery) both imply that DRW's bids were only focused on the Settlement Period. By my assessment as shown in **Exhibit 5**, a full 60% of DRW's bids were made outside the Settlement Period, at prices similar to the bids made during the Settlement Period.